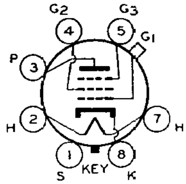


RCA-6K7



TRIPLE-GRID SUPER-CONTROL AMPLIFIER

The 6K7 is a triple-grid super-control amplifier tube of the All-Metal type recommended for service in the radio-frequency and intermediate-frequency stages of radio receivers designed for its characteristics. The ability of this tube to handle unusual signal voltages without cross-modulation and modulation-distortion makes it adaptable to the r-f and i-f stages of receivers employing automatic volume control.

CHARACTERISTICS

Heater Voltage (A. C. or D. C.)				6.3	Volts
Heater Current				0.3	Ampere
Plate Voltage	90	180	250	250 *max.*	Volts
Screen Voltage	90	75	100	125 *max.*	Volts
Grid Voltage (Minimum)	−3	−3	−3	−3	Volts
Suppressor	Connected to cathode at socket				
Plate Current	5.4	4.0	7.0	10.5	Milliamperes
Screen Current	1.3	1.0	1.7	2.6	Milliamperes
Plate Resistance	0.315	1.0	0.8	0.6	Megohm
Amplification Factor	400	1100	1160	990	
Transconductance	1275	1100	1450	1650	Micromhos
Grid Voltage*	−38.5	−32.5	−42.5	−52.5	Volts
Grid-Plate Capacitance°				0.005 *max.*	μμf
Input Capacitance°				7	μμf
Output Capacitance°				12	μμf
Cap					Miniature
Base					Small Wafer Octal 7-Pin

* For transconductance = 2 micromhos.

° With shell connected to cathode.

INSTALLATION

The **base** pins of the 6K7 fit the standard octal socket which may be installed to hold the tube in any position.

For **heater** operation and **cathode** connection, refer to INSTALLATION for type 6A8.

Control-grid bias variation will be found effective in changing the volume of the receiver. In order to obtain adequate volume control, an available grid-bias voltage of approximately 50 volts will be required. The exact value will depend upon the circuit design and operating conditions. This voltage may be obtained, depending on the receiver requirements, from a potentiometer across a fixed supply voltage or by the use of a variable self-bias resistor in the cathode circuit.

The **screen** voltage may be obtained from a potentiometer or bleeder circuit across the B-supply source. Due to the screen current characteristics of the 6K7, a resistor in series with the high-voltage supply may be employed for obtaining the screen voltage provided the cathode-resistor method of bias control is used. This method, however, is not recommended if the high-voltage B-supply exceeds 250 volts. Furthermore, it should be noted that the use of a resistor in the screen circuit will have an effect on the change in plate resistance with variation in suppressor voltage in case the suppressor is utilized for control purposes.

The **suppressor** may be connected directly to the cathode or it may be made negative with respect to the cathode. For the latter condition, the suppressor voltage may be obtained from a potentiometer or bleeder circuit for manual volume- and selectivity-control, or from the drop in a resistor in the plate circuit of the automatic volume-control tube.

APPLICATION

As a **radio-frequency amplifier**, the 6K7 is especially applicable to radio receiver design because of its ability to reduce cross-modulation effects, its remote "cut-off" feature, and its flexible adaptability to circuit combinations and to receiver design. Recommended conditions for the 6K7 as an amplifier are given under CHARACTERISTICS.

To realize the maximum benefit of the long "cut-off" feature of this tube, it is necessary to apply a variable grid bias and to maintain the screen at a constant potential with respect to the cathode. Good results, however, may be obtained by using a variable cathode resistance. Such a resistance, of course, reduces the screen potential by the amount that the bias is increased and thus hastens the "cut-off." Therefore, the ability of the tube to handle large signals is somewhat impaired. This effect may be nullified by means of a series resistor in the screen circuit.

The use of series resistors for obtaining satisfactory control of screen voltage in the case of four-electrode tubes is usually impossible because of secondary emission phenomena. In the 6K7, however, the suppressor practically removes these effects and it is therefore possible to obtain satisfactorily the screen voltage from the plate supply or from some high intermediate voltage providing these sources do not exceed 250 volts. With this method, the screen-to-cathode voltage will fall off very little from minimum to maximum value of cathode-control resistor. In some cases, it may actually rise. This rise of screen-to-cathode voltage above the normal maximum value is allowable because the screen and the plate current are reduced simultaneously by a sufficient amount to prevent damage to the tube. It should be recognized in general that the series-resistor method of obtaining screen voltage from a higher voltage supply necessitates the use of the variable cathode-resistor method of controlling volume in order to prevent too high a voltage on the screen. When screen and control-grid voltage are obtained in this manner, the remote "cut-off" advantage of the 6K7 may be fully realized.

As a **mixer** in superheterodyne circuits, the 6K7 may be used although a pentagrid mixer or pentagrid converter type is generally preferable. The 6K7 as a mixer is capable of producing, under the proper conditions of grid and local oscillator voltage, a gain of about one-third that which can be obtained in an intermediate-frequency amplifier stage. This gain can be controlled by varying the grid bias either from a separate supply or from a variable resistor in the cathode circuit. This is a desirable feature in receivers employing automatic volume-control, because it enables a much lower threshold input to be received without loss of amplification and permits the reception of high input voltages without loss of control. Recommended conditions for the 6K7 as a superheterodyne mixer follow: Plate voltage, 250 volts; screen voltage, 100 volts; suppressor connected to cathode at socket; and grid-bias voltage, −10 volts approximate (with 7-volt oscillator peak swing).

A plate family of curves is given under type 78.